

in a group of faculae near the north-east limb in the place indicated by Herr Weber's observation. The position of the spot has now been measured on the two photographs, which were taken at 21h. 46m. 35s. and 22h. 1m. 4s. Greenwich mean time respectively, and the following are the means of the two sets of results which agree very closely:—

1876, April 3d, 21h. 54m.			
Distance from sun's centre along arc of	}		
parallel		788"	
Diff. of R.A. (Spot - ☉)		+ 52 ^s .3	
Diff. of N.P.D. (Spot - ☉)		- 218 ^m .5	
Distance from sun's centre		817"	
Distance from N.E. limb		145"	
Diameter of spot		4"	

As Herr Weber's observation was made at 4h. 25m. Berlin mean time, or 3h. 31m. Greenwich mean time, the sun's rotation in the interval—5h. 37m.—would have carried the spot to a distance of about 163" from the limb, as appears from a rough computation, and thus the position would agree tolerably well with that given by Herr Weber. There can be no question that the spot on the Greenwich photographs, which is the same as that observed by M. Ventosa, is an ordinary sun-spot without penumbra, and not an intra-mercurial planet.

Royal Observatory, Greenwich, October 4

CAUTIONS AS TO INTRA-MERCURIAL OBSERVATIONS

AT the Paris Academy on the 2nd instant, Dr. Janssen read a paper containing some very timely cautions as to the observation of the transit of intra-Mercurial bodies across the sun. He maintains that we have the means of investigating the problem which at present is interesting astronomers of a most satisfactory kind and leading to a certain and rational result. The first of these means is the knowledge we now possess of the solar envelope, and the second is photography. A criterion of a true transit is that the spot be well rounded against the solar disc, that it have a rapid displacement on the surface of the disc, a motion quite different from the apparent motion of solar spots. These requirements would eliminate a great number of doubtful observations, and even then the transit might not be a real one. Many solar spots are distinctly rounded, but then error is apt to creep in in the observation of the proper movement, especially when the observation is made with a telescope having no equatorial mounting, the diurnal motion making the spot appear to be constantly changing place. The rapid disappearance of a spot is no proof that it is outside the sun; at the minimum period spots have a tendency to dissolve rapidly. It follows that the isolated observations made by persons who have no thorough knowledge, or who have not suitable instruments, are comparatively valueless. While giving the highest place to photography, Dr. Janssen thinks telescopic observations of so great importance that he gives some hints for the guidance of observers.

There are circumstances connected with the constitution of the photosphere which may afford guidance even in fugitive observations. Briefly, as a solar spot is a phenomenon of the photosphere, a disturbing phenomenon at the highest point of the region where it is produced, it follows that the ordinary aspect of the photosphere is modified all round it. Moreover, if the spot is sufficiently distant from the centre of the disc, it ought to present the perspective effects of an object placed upon the vanishing surface of a globe. Finally the region of the sun where the spot appears ought to be attended to, to discover its solar latitude, since we know that the spots are located in two main regions, to the north and to the south of the sun's equator. More valuable still is the following test. It is evident that a moving body interposed between our eye and the solar surface ought to produce a succession

of eclipses of the granulations covering that surface; to cover successively those towards which it moves and uncover those on the opposite side. This phenomenon of emersion and immersion is the most decisive of all tests of the value of a brief observation; it requires, however, a good instrument of considerable power. Dr. Janssen advises moreover that the regions around the sun's disc to three or four minutes angular distance should be explored with the greatest care; as at that distance the coronal atmosphere is bright enough for a body of a fraction of a minute in diameter to give a visible eclipse. A trustworthy observation of a body seen either entering or leaving the sun's disc under such circumstances, is of the very highest value; moreover the field of observation is thus greatly increased. But eye observations of the sun must at best be but isolated, and photography furnishes the only sure method of unerring, precise, authentic observation, surpassing in value that of the ablest astronomer.

The question of intra-Mercurial bodies shows once more the immense importance of obtaining uninterrupted international observation of the sun's face. Hence the value of a mechanical photographic revolver that would, every hour, say, photograph the sun, without requiring the interference of any one. A number of these distributed over the globe would, in a few years, give us such a knowledge of the sun's surface as it would be impossible to obtain under any other circumstances.

RUSSIAN EXPLORATION IN ASIA DURING THE PAST SUMMER

THE following information as to the different scientific expeditions sent during the past summer by the Russian learned societies for the exploration of various parts of Russia and of the adjacent territories will probably be of interest. We begin with Central Asia, leaving for another paper the report upon the proceedings of the expeditions to the Obi and Jenissei.

M. Prshevalsky has left Omsk, and we have already given some account of the scientific staff of the expedition and the route he proposes to follow.

M. Severtsoff, as reported by the *Turkestanstija Vedomosti*, was to begin his travels in the Fergana district and in the adjoining hilly tracts during this autumn. He will be accompanied by M. Sharz, astronomer, M. Mushketoff, mining engineer, M. Smirnov, botanist, M. Skvortsoff, zoologist, one topographer, and six Cossacks. During next summer he proposes to explore the Alai and the mountains south of Kokan, and to penetrate about the autumn into the Pamir, reaching here the route followed by the members of Mr. Forsyth's expedition.

M. Potanin, as reported by the *Sibir*, reached Omsk on June 27. The object of his expedition is the geographical, ethnographical, and economical exploration of North-western Mongolia, for which purpose 9,400 roubles were allowed by the Geographical Society and by the Government. He will be accompanied by his wife, M. Posdnéeff, linguist, M. Raphailoff, topographer, M. Beresoffsky, volunteer, and M. Kolomiitseff, zoologist, sent by M. Severtsoff. Starting from the Zaisansky post on the Irtysh, M. Potanin will follow the steppe-valley of the Black Irtysh and proceed to Urunga, Khobdo, the Oobsa-nor. For winter-quarters he will then go south, through Oolassootai to the eastern parts of the Tian Shan. During the following summer, taking a northern course, the expedition proposes to reach the sources of the Jenissei and the Kossogol lake, returning south again for the winter to the eastern foot of the Shangai-alin and to the expansion of the Onguin river. During his stay in Omsk, M. Posdnéeff has assiduously visited the town's archives, and has found some very interesting documents; for instance, letters from the Telengout chiefs written in Kalmuck with Mongolian alphabet, whilst now the Telengouts do not use any written language.

M. Poliakoff, who was sent by the St. Petersburg Academy for the exploration of the fauna of the Lower Obi, which fauna has not been explored since the times of Pallas's companion Zoëff, has already collected many interesting zoological materials. He found, also, vestiges of the stone age. Having received some pecuniary help from the municipal councils of Tiumen and Tobolsk, he proposed to extend his travels to the mouth of the Obi, and to reach, if possible, the Tasofskaia Gooba.

M. Chersky, of the Siberian Branch of the Geographical Society, explored the lower parts of the Irkoot river, where it enters its deep cañon below the Toonka settlement. This cañon has been traversed but once, in 1855, by M. Bakshevitch. It is reported, by the *Sibir*, that M. Chersky, as might be expected, has collected many materials for the settling of the much-debated question on the origin of the Toonka valley, and of the trough of the Baikal.

M. Regel (son of the botanist), having accepted the position of surgeon in the Kooldsha district, is exploring the country and preparing large collections for the St. Petersburg Academy and Botanical Gardens; and Capt. Larionoff with three preparators for natural history collections, continues his investigation of the hilly tracts of the same district.

Prof. Wagner, zoologist, has just returned from his excursion to the White Sea. He stayed more than a month on the Solovetzky islands, engaged in the collection of materials for his biologic-morphological studies; and his companions, Prof. Grigorief, and the students Andréeff and Mereshkofsky, have traversed the shores of the White Sea, and returned with large collections of the sea-fauna.

The zoologist, M. Grimm, sent for the exploration of the Caspian fauna, gives ampler information as to his proceedings, in letters published in the *Golos*. Having at his disposition the steamer *Persianin*, he cruised the sea in various directions. On the cruise between Bakoo and Fort Alexandrofsk he dredged at various depths between six and 300 fathoms, bringing up immense quantities of animal forms. The most interesting were: molluscs, *Adana vitrea*, enormous *Cardium crassum*, and an undetermined species of *Cardium*; among the sponges, the *Reniera flava*; a new species of *Isopoda*, some new species of *Gammaridae*, a new *Mysis*, the *Idotea entomon*, &c. Among the fishes deserve to be mentioned some small ones from a depth of 70-90 fathoms, as transparent as glass, and a black marine species of *Lucioperca*, more common at Fort Alexandrofsk than the common *Lucioperca sandra*.¹ Further dredgings on the cruise to Krasnovodsk, made during a dead calm, at depths from 6 to 130 fathoms, produced similar large quantities of animals, many of them found for the first time in the Caspian, or totally new. The more interesting were: living *Adana vitrea*, *Cardium*, many *Gasteropoda*, a new species of *Neritina*, and a living *Planorbis micromphalus* (discovered in 1874), from a beautiful rose-colour. The *Crustacea* and *Vermes* were also numerous. But the most beautiful of the collection found are sponges collected near the Kara-boogas gulf at depths of 40-48 fathoms. Marked by the most vivid colours, from pale-yellow to a bright red, they cover nearly, without interruption, the stones, assuming the forms of flat thick carpets, and half-spherical, totally spherical, or egg-shaped masses, reaching the size of a child's fist. Altogether, the two cruises in the northern parts of the Caspian gave a very interesting, varied, and rich collection of animal forms, and proved that the northern part of the sea has a richer fauna than the south, which, at first, seemed improbable. It is well to remark, also, that on the eastern shores, where the water reached as high a temperature as 31° Cels., the animals occupy deeper zones than on the western shores where the temperature of the water is lower. Having

¹ The whole number of species of fishes in the Caspian M. Grimm estimates to be about eighty, ten of which are new species, discovered by the explorer in 1874.

made some excursions in the neighbourhood of Krasnovodsk, M. Grimm proceeded to Bakoo, but the weather was very stormy and the dredgings were made at small depths (sixteen fathoms), producing only already known forms. From Bakoo M. Grimm proceeded northwards, proposing to explore the greatest depths of the northern parts of the sea.

NOTES

AT the recent meeting of the Association of German Naturalists and Physicians at Hamburg, a proposal for the establishment of zoologico-botanical stations on the German coast was reported on and discussed. The high importance of such establishments to German science was recognised. While all praise was accorded to the Naples establishment, considerations of distance, expense, and climate, render it desirable that similar stations should be established within easier reach of German students and biological investigators. The report of the Committee appointed to consider the matter discussed the suitability of various places for such establishments, and concludes by strongly recommending Kiel on the Baltic and Heligoland in the North Sea. The Committee are of opinion that the establishments should be established on the broadest bases for the investigation not only of the botany and zoology of the seas referred to, but also for their physics, their chemistry, and for meteorology. In the discussion which followed it was suggested that the Heligoland station might be conducted in connection with English men of science. The Association finally decided as follows:—1. The erection of stations for zoologico-botanical research at Kiel and in Heligoland is necessary for the development of German science. 2. The Association approves of the drawing up of a memorandum and petition, to be sent to the Imperial Chancellor, the Bundersrath, and the Governments of the several States of the Empire, with the additional request to the Prussian Government that it would take the initiative in the matter. 3. The Association to appoint a commission to draw up and distribute the memorandum. 4. The memorandum to be circulated among all eminent German scientific men, in order to obtain as many signatures as possible. The following Commission was appointed to draw up the memorandum:—Professors Alex. Braun, Ernst Haeckel, Rud. Leuckart, Dr. H. Ad. Meyer, Alex. Pagenstecher, Pringsheim, and Julius Sachs, with power to add to their number. It is not necessary to say one word in commendation of this admirable scheme; we cannot doubt that it will be successfully carried out.

DR. JANSSEN is devising the construction of an automatic photographic revolver, which will take a photograph of the sun every hour each day of the year, from sunrise to sunset. The photographs which will be taken under cloudy conditions, will be useless so far as sunspots are concerned, but they might be utilised for meteorological purposes. The others will be kept and tabulated. The advantage of this plan is that it will dispense with any observer, and will obtain a mechanical regularity. A communication will be made very shortly to the Academy of Sciences on the invention which was suggested by the discussion on the transit of "Vulcan." It will be set to work in the physical observatory of Dr. Janssen.

AT the inaugural meeting of the third session of the Yorkshire College of Science, held on Friday last, Lord Frederick Cavendish, M.P., the President of the College, drew attention to a report drawn up by Mr. Beaumont, the Instructor in the Textile Industry Department, in conjunction with Mr. Watts Maclaren, on the Weaving Schools of the Continent. It appears that there are no less than twenty-five separate schools of instruction in connection with textile industries, in addition to seven belonging to Polytechnic Institutions, scattered throughout France, Belgium, and Germany, and in spite of the fact that the majority